

AGILENT TECHNOLOGIES, INC.  
Legal Department, DL429  
Intellectual Property Administration  
P. O. Box 7599  
Loveland, Colorado 80537-0599

ATTORNEY DOCKET NO. 70040065-1

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

RECEIVED  
CENTRAL FAX CENTER

OCT 20 2005

Inventor(s): Chua et al.

Serial No.: 10/761,762

Examiner: Richards, N. Drew

Filing Date: January 21, 2004

Group Art Unit: 2815

Title: **DEVICE AND METHOD FOR EMITTING OUTPUT LIGHT USING GROUP IIB ELEMENT  
SELENIDE-BASED PHOSPHOR MATERIAL**

COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on August 26, 20005.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) **\$500.00**.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)(1)-(5)) for the total number of months checked below:

|                          |              |           |
|--------------------------|--------------|-----------|
| <input type="checkbox"/> | one month    | \$ 120.00 |
| <input type="checkbox"/> | two months   | \$ 450.00 |
| <input type="checkbox"/> | three months | \$1020.00 |
| <input type="checkbox"/> | four months  | \$1590.00 |

☐ The extension fee has already been filled in this application.

☒ (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

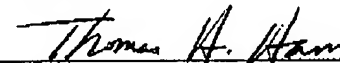
Please charge to Deposit Account **50-1078** the sum of **\$500.00**. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account **50-1078** pursuant to 37 CFR 1.25.

A duplicate copy of this transmittal letter is enclosed.

Respectfully submitted,

Chua et al.

By



Thomas H. Ham  
Attorney/Agent for Applicant(s)

Reg. No. 43,654

Date: 10/20/2005

Telephone No. (925) 249-1300

☐ I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date of Deposit: OR

☒ I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office on the date shown below.

Date of Facsimile: 10/20/2005

Typed Name: Thomas H. Ham

Signature: RECEIVED  
OIPE/IAP

OCT 21 2005

Rev 06/05 (Apf/Brief)

Attorney Docket No. 70040065-1

PATENT APPLICATION

RECEIVED  
CENTRAL FAX CENTER

OCT 20 2005

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Chua et al.

Group Art Unit: 2815

Serial No. 10/761,762

Confirmation No. 2866

Filed: January 21, 2004

Examiner: Richards, N. Drew

For: DEVICE AND METHOD FOR EMITTING OUTPUT LIGHT USING GROUP  
IIB ELEMENT SELENIDE-BASED PHOSPHOR MATERIALCommissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450BRIEF ON APPEAL

Sir/Madam:

This brief is in furtherance of Applicants' Notice of Appeal filed on August 26, 2005, appealing the decision of the Examiner dated June 29, 2005 finally rejecting claims 1-3, 5-10, 12-17, 19 and 20. A copy of the claims appears in the Appendix to this brief. This brief is transmitted in triplicate.

10/21/2005 MGE BREM1 00000095 501078 10761762


01 FC:1402 500.00 DA

## CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. 1.8

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being facsimile transmitted to the Patent and Trademark Office facsimile number (571) 273-8300 on October 20, 2005.

Number of Pages: 35 (including TRANSMITTAL LETTER)

Signed:



Typed Name: Thomas H. Ham

I. Real Party in Interest

The real party in interest in this appeal is Agilent Technologies, Inc., a Delaware Corporation, having a place of business at 3500 Deer Creek Road, Palo Alto, California 94304.

II. Related Appeals and Interferences

There are currently no related appeals or interference proceedings in progress that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the present Appeal.

III. Status of Claims

Claims 1-20 were originally filed with the application on January 21, 2004. In the Amendment and Response to Office Action filed on April 11, 2005, claims 1, 3, 5-8, 10, 13-15 and 17 were amended. No claims have been amended, canceled, or added for purposes of this Appeal.

Claims 1, 2, 5-9, 12-16, 19 and 20 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by U.S. Patent Application No. 2003/0008431 A1 (Matsubara et al., hereafter "Matsubara"). Furthermore, claims 3, 10 and 17 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Matsubara in view of U.S. Patent No. 6,509,651 B1 (Matsubara et al.). Claims 4, 11 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

This Appeal is made with regard to pending claims 1-20.

IV. Status of Amendments

No amendments were filed subsequent to final rejection.

V. Summary of the Invention

The claimed invention is a device and method for emitting output light using Group IIB element Selenide-based phosphor material to convert some of the original light emitted from a light source, e.g., a light emitting diode (LED) die, of the device to a longer wavelength light to change the optical spectrum of the output light (see Applicants' specification on page 2, lines 22-33). According to the invention, as recited in claims 1 and 8, a device for emitting output light comprises a semiconductor chip or die (102) that emits first light of a first peak wavelength in a 481-520 nm range, and a wavelength-shifting region or a phosphor-containing medium (116; 216B; 216C) optically coupled to the semiconductor chip or die to receive the first light. The wavelength-shifting region or the phosphor-containing medium includes Group IIB element Selenide-based phosphor material (118) having a property to convert some of the first light to second light of a second peak wavelength in a red wavelength range. The Group IIB element Selenide-based phosphor material includes Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver. The first light and the second light are components of the output light. According to the invention, as recited in claim 15, a method for emitting output light comprises generating (602) first light of a first peak wavelength in a 481-520 nm range at a semiconductor die, including emitting the first light out of the semiconductor die, receiving (604) the first light emitted out of the semiconductor die, including converting some of the first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material, and emitting (606) the first light and the second light as components of the output light. The Group IIB element Selenide-based phosphor material includes Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.

30

VI. Issues

Whether claims 1, 6-8 and 13-15 are anticipated under 35 U.S.C. 102(b) by Matsubara.

5

VII. Grouping of Claims for Each Contested Ground of Rejection

For purposes of this Appeal, claims 1, 8 and 15 stand or fall together, claims 6 and 13 stand or fall together, and claims 7 and 14 stand or fall together. The reason why the above-identified claims are grouped together is explained in the following Argument section.

10

VIII. Argument

15

A. Rejection of Claims 1, 8 and 15 Under 35 U.S.C. §102(b)

The independent claims 1, 8 and 15 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by the cited references of Matsubara (U.S. Patent Application No. 2003/0008431 A1). However, each recited element of the independent claims 1, 8 and 15 is not disclosed in the cited reference of Matsubara. Consequently, the independent claims 1, 8 and 15 are not anticipated by the cited reference of Matsubara.

20

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP §2131. The independent claim 1 recites in part “a semiconductor chip” and “a wavelength-shifting region” that includes “Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.” Similarly, the independent claim 8 recites in part “a semiconductor die” and “a phosphor-containing medium” that includes “Group IIB element Selenide activated by at

30

*least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.*" The cited reference of Matsubara does not disclose each of these recited elements of the independent claims 1 and 8.

5           The reference of Matsubara does not disclose "*a semiconductor chip*" or "*a semiconductor die*" AND "*a wavelength-shifting region*" or "*a phosphor-containing medium*" that includes "*Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver,*" as recited in the independent claims 1 and 8. With respect  
10 to claim 1, the Examiner asserts that the epitaxial light emission structure 2 of Matsubara is considered "*a semiconductor chip*" and the ZnSe substrate 1 of Matsubara is considered "*a wavelength-shifting region*". With respect to claim 8, the Examiner asserts that the epitaxial light emission structure 2 of Matsubara is considered "*a semiconductor die*" and the ZnSe substrate 1 of Matsubara is  
15 considered "*a phosphor-containing medium*". However, as illustrated and described in Matsubara, the ZnSe substrate 1 and the epitaxial light emission structure 2 are parts of an LED 5, which is referred to as a "chip" (for example, see paragraphs [0040] and [0064]). Consequently, the epitaxial light emission structure 2 of Matsubara is not "*a semiconductor chip*" or "*a semiconductor die*,"  
20 as recited in the independent claims 1 and 8. Thus, the independent claims 1 and 8 are not anticipated by the cited reference of Matsubara.

          As a fall back position, the Examiner asserts on page 8 of the Final Office Action that "[f]urther, 'semiconductor chip' or 'semiconductor die' and the  
25 associated language in the claims do not preclude the wavelength-shifting region being integrally [sic] part of the same chip or die." Applicants understand that claims must be given their broadest reasonable interpretation during patent examination. However, it is not reasonable to interpret the independent claims 1 and 8 such that the claimed "*wavelength-shifting region*" or "*phosphor-containing  
30 medium*" may be an integral part of the claimed "*semiconductor chip*" or "*semiconductor die*" when the claims recite "*a semiconductor chip*" or "*a semiconductor die*" AND "*a wavelength-shifting region*" or "*a phosphor-containing medium*" as separate elements. Furthermore, the independent claim 1

recites the “*wavelength-shifting region*” as “*a wavelength-shifting region optically coupled to said semiconductor chip to receive said first light.*” Such claim language does not make sense if the “*wavelength-shifting region*” is an integral part of the claimed “*semiconductor chip.*”

5

The independent claim 15 recites in part “*generating first light of a first peak wavelength in a 481-520 nm range at a semiconductor die, including emitting said first light out of said semiconductor die*” and “*receiving said first light emitted out of said semiconductor die, including converting some of said first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material, said Group IIB element Selenide-based phosphor material including Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.*” Since the ZnSe substrate 1 of Matsubara is part of a chip or die, Matsubara does not disclose “*receiving said first light emitted out of said semiconductor die, including converting some of said first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material,*” as recited in the independent claim 15. Thus, the independent claim 15 is also not anticipated by the cited reference of Matsubara.

20

B. Rejection of Claims 6 and 13 Under 35 U.S.C. §102(b)

The dependent claims 6 and 13 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by the cited references of Matsubara. In particular, the Examiner asserts that “the substrate 1 is coupled to the epitaxial structure 2 together forming a lamp.”

25

The dependent claim 6 recites “*wherein said wavelength-shifting region is a part of a lamp coupled to said semiconductor chip.*” Similarly, the dependent claim 13 recites “*wherein said phosphor-containing medium is a part of a lamp coupled to said semiconductor die.*” As explained above, the ZnSe substrate 1 and the epitaxial light emission structure 2 of Matsubara are parts of the

30

semiconductor chip 5. Thus, the epitaxial light emission structure 2 of Matsubara cannot be "*a part of a lamp coupled to said semiconductor*" chip or die, as recited in the dependent claims 6 and 13. Thus, the dependent claims 6 and 13 are not anticipated by the cited reference of Matsubara.

5

C. Rejection of Claims 7 and 14 Under 35 U.S.C. §102(b)

The dependent claims 7 and 14 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by the cited references of Matsubara. In particular, the  
10 Examiner asserts that "the entire device of figure 1 is considered a lamp as it outputs white light."

The dependent claim 7 recites "*wherein said wavelength-shifting region is a lamp coupled to said semiconductor chip*." Similarly, the dependent claim 14  
15 recites "*wherein said phosphor-containing medium is a lamp coupled to said semiconductor die*." Again, the ZnSe substrate 1 and the epitaxial light emission structure 2 of Matsubara are parts of the semiconductor chip 5. Thus, the epitaxial light emission structure 2 of Matsubara cannot be "*a lamp coupled to said semiconductor*" chip or die, as recited in the dependent claims 7 and 14. Thus,  
20 the dependent claims 7 and 14 are not anticipated by the cited reference of Matsubara.

SUMMARY

25 Contrary to the assertions made by the Examiner, the ZnSe substrate 1 and the epitaxial light emission structure 2 of Matsubara are parts of a single chip. Thus, the independent claims 1 and 8 are not anticipated by Matsubara because Matsubara does not disclose "*a semiconductor chip*" or "*a semiconductor die*" AND "*a wavelength-shifting region*" or "*a phosphor-containing medium*" that  
30 includes "*Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver*." Similarly, the independent claim 15 is not anticipated by Matsubara because Matsubara does not disclose "*receiving said first light emitted out of said*"



semiconductor die, including converting some of said first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material.” Furthermore, the dependent claims 6, 7, 13 and 14 are not anticipated by Matsubara because Matsubara does not disclose “a wavelength-shifting region” or “a phosphor-containing medium” that is a part of or is “a lamp coupled to said semiconductor” chip or die.

For all the foregoing reasons, it is earnestly and respectfully requested that the Board of Patent Appeals and Interferences reverse the rejections of the Examiner regarding claims 1-3, 5-10, 12-17, 19 and 20, so that this case may be allowed and pass to issue in a timely manner.

15

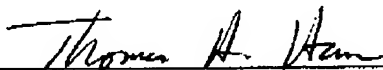
Respectfully submitted,

Chua et al.

20

Date: October 20, 2005

By:



Thomas H. Ham

Registration No. 43,654

Telephone: (925) 249-1300

**Appendix**

- 1     1.     A device for emitting output light, said device comprising:  
2                 a semiconductor chip that emits first light of a first peak  
3     wavelength in a 481-520 nm range; and  
4                 a wavelength-shifting region optically coupled to said  
5     semiconductor chip to receive said first light, said wavelength-shifting region  
6     including Group IIB element Selenide-based phosphor material having a property  
7     to convert some of said first light to second light of a second peak wavelength in a  
8     red wavelength range, said Group IIB element Selenide-based phosphor material  
9     including Group IIB element Selenide activated by at least one element selected  
10    from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver, said  
11    first light and said second light being components of said output light.
- 1     2.     The device of claim 1 wherein said Group IIB element Selenide-based  
2     phosphor material of said wavelength-shifting region includes Zinc Selenide.
- 1     3.     The device of claim 2 wherein said Group IIB element Selenide-based  
2     phosphor material of said wavelength-shifting region includes said Zinc Selenide  
3     activated by Copper.
- 1     4.     The device of claim 1 wherein said Group IIB element Selenide-based  
2     phosphor material of said wavelength-shifting region includes Cadmium Selenide.
- 1     5.     The device of claim 1 wherein said semiconductor chip is a light emitting  
2     diode die that can generate said first light of said first peak wavelength.
- 1     6.     The device of claim 1 wherein said wavelength-shifting region is a part of  
2     a lamp coupled to said semiconductor chip.
- 1     7.     The device of claim 1 wherein said wavelength-shifting region is a lamp  
2     coupled to said semiconductor chip.

1 8. A device for emitting output light, said device comprising:  
2 a semiconductor die that emits first light of a first peak wavelength  
3 in a 481-520 nm range; and  
4 a phosphor-containing medium positioned to receive said first  
5 light, said phosphor-containing medium including Group IIB element Selenide-  
6 based phosphor material having a property to convert some of said first light to  
7 second light of a second peak wavelength in a red wavelength range, said Group  
8 IIB element Selenide-based phosphor material including Group IIB element  
9 Selenide activated by at least one element selected from a group consisting of  
10 Copper, Chlorine, Fluorine, Bromine and Silver, said first light and said second  
11 light being components of said output light.

1 9. The device of claim 8 wherein said Group IIB element Selenide-based  
2 phosphor material of said phosphor-containing medium includes Zinc Selenide.

1 10. The device of claim 9 wherein said Group IIB element Selenide-based  
2 phosphor material of said phosphor-containing medium includes said Zinc  
3 Selenide activated by Copper.

1 11. The device of claim 8 wherein said Group IIB element Selenide-based  
2 phosphor material of said phosphor-containing medium includes Cadmium  
3 Selenide.

1 12. The device of claim 8 wherein said semiconductor die is a light emitting  
2 diode die.

1 13. The device of claim 8 wherein said phosphor-containing medium is a part  
2 of a lamp coupled to said semiconductor die.

1 14. The device of claim 8 wherein said phosphor-containing medium is a lamp  
2 coupled to said semiconductor die.

1 15. A method for emitting output light, said method comprising:  
2 generating first light of a first peak wavelength in a 481-520 nm  
3 range at a semiconductor die, including emitting said first light out of said  
4 semiconductor die;  
5 receiving said first light emitted out of said semiconductor die,  
6 including converting some of said first light to second light of a second peak  
7 wavelength in a red wavelength range using Group IIB element Selenide-based  
8 phosphor material, said Group IIB element Selenide-based phosphor material  
9 including Group IIB element Selenide activated by at least one element selected  
10 from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver; and  
11 emitting said first light and said second light as components of said  
12 output light.

1 16. (original) The method of claim 15 wherein said Group IIB element  
2 Selenide-based phosphor material includes Zinc Selenide.

1 17. The method of claim 16 wherein said Group IIB element Selenide-based  
2 phosphor material includes said Zinc Selenide activated by Copper.

1 18. The method of claim 15 wherein said Group IIB element Selenide-based  
2 phosphor material includes Cadmium Selenide.

1 19. The method of claim 15 wherein said generating includes generating said  
2 first light of said first peak wavelength at a light emitting diode die.

1 20. The method of claim 19 wherein said light emitting diode die is configured  
2 to generate said first light such that said first peak wavelength is within a blue-  
3 green region of the visible light spectrum.

Attorney Docket No. 70040065-1

PATENT APPLICATION

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Chua et al.

Group Art Unit: 2815

Serial No. 10/761,762

Confirmation No. 2866

Filed: January 21, 2004

Examiner: Richards, N. Drew

For: DEVICE AND METHOD FOR EMITTING OUTPUT LIGHT USING GROUP  
IIB ELEMENT SELENIDE-BASED PHOSPHOR MATERIAL

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

BRIEF ON APPEAL

Sir/Madam:

This brief is in furtherance of Applicants' Notice of Appeal filed on August 26, 2005, appealing the decision of the Examiner dated June 29, 2005 finally rejecting claims 1-3, 5-10, 12-17, 19 and 20. A copy of the claims appears in the Appendix to this brief. This brief is transmitted in triplicate.

## CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. 1.8

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being facsimile transmitted to the Patent and Trademark Office facsimile number (571) 273-8300 on October 20, 2005.

Number of Pages: 35 (including TRANSMITTAL LETTER)

Signed: Thomas H. Ham

Typed Name: Thomas H. Ham

I. Real Party in Interest

The real party in interest in this appeal is Agilent Technologies, Inc., a Delaware Corporation, having a place of business at 3500 Deer Creek Road, Palo Alto, California 94304.

II. Related Appeals and Interferences

There are currently no related appeals or interference proceedings in progress that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the present Appeal.

III. Status of Claims

Claims 1-20 were originally filed with the application on January 21, 2004. In the Amendment and Response to Office Action filed on April 11, 2005, claims 1, 3, 5-8, 10, 13-15 and 17 were amended. No claims have been amended, canceled, or added for purposes of this Appeal.

Claims 1, 2, 5-9, 12-16, 19 and 20 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by U.S. Patent Application No. 2003/0008431 A1 (Matsubara et al., hereafter "Matsubara"). Furthermore, claims 3, 10 and 17 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Matsubara in view of U.S. Patent No. 6,509,651 B1 (Matsubara et al.). Claims 4, 11 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

This Appeal is made with regard to pending claims 1-20.

IV. Status of Amendments

No amendments were filed subsequent to final rejection.

V. Summary of the Invention

The claimed invention is a device and method for emitting output light using Group IIB element Selenide-based phosphor material to convert some of the original light emitted from a light source, e.g., a light emitting diode (LED) die, of the device to a longer wavelength light to change the optical spectrum of the output light (see Applicants' specification on page 2, lines 22-33). According to the invention, as recited in claims 1 and 8, a device for emitting output light comprises a semiconductor chip or die (102) that emits first light of a first peak wavelength in a 481-520 nm range, and a wavelength-shifting region or a phosphor-containing medium (116; 216B; 216C) optically coupled to the semiconductor chip or die to receive the first light. The wavelength-shifting region or the phosphor-containing medium includes Group IIB element Selenide-based phosphor material (118) having a property to convert some of the first light to second light of a second peak wavelength in a red wavelength range. The Group IIB element Selenide-based phosphor material includes Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver. The first light and the second light are components of the output light. According to the invention, as recited in claim 15, a method for emitting output light comprises generating (602) first light of a first peak wavelength in a 481-520 nm range at a semiconductor die, including emitting the first light out of the semiconductor die, receiving (604) the first light emitted out of the semiconductor die, including converting some of the first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material, and emitting (606) the first light and the second light as components of the output light. The Group IIB element Selenide-based phosphor material includes Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.

30

VI. Issues

Whether claims 1, 6-8 and 13-15 are anticipated under 35 U.S.C. 102(b) by Matsubara.

5

VII. Grouping of Claims for Each Contested Ground of Rejection

For purposes of this Appeal, claims 1, 8 and 15 stand or fall together, claims 6 and 13 stand or fall together, and claims 7 and 14 stand or fall together. The reason why the above-identified claims are grouped together is explained in the following Argument section.

10

VIII. Argument

15

A. Rejection of Claims 1, 8 and 15 Under 35 U.S.C. §102(b)

The independent claims 1, 8 and 15 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by the cited references of Matsubara (U.S. Patent Application No. 2003/0008431 A1). However, each recited element of the independent claims 1, 8 and 15 is not disclosed in the cited reference of Matsubara. Consequently, the independent claims 1, 8 and 15 are not anticipated by the cited reference of Matsubara.

20

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP §2131. The independent claim 1 recites in part “a semiconductor chip” and “a wavelength-shifting region” that includes “Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.” Similarly, the independent claim 8 recites in part “a semiconductor die” and “a phosphor-containing medium” that includes “Group IIB element Selenide activated by at

25

30



*least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.*" The cited reference of Matsubara does not disclose each of these recited elements of the independent claims 1 and 8.

5           The reference of Matsubara does not disclose "*a semiconductor chip*" or "*a semiconductor die*" AND "*a wavelength-shifting region*" or "*a phosphor-containing medium*" that includes "*Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver,*" as recited in the independent claims 1 and 8. With respect  
10 to claim 1, the Examiner asserts that the epitaxial light emission structure 2 of Matsubara is considered "*a semiconductor chip*" and the ZnSe substrate 1 of Matsubara is considered "*a wavelength-shifting region*". With respect to claim 8, the Examiner asserts that the epitaxial light emission structure 2 of Matsubara is considered "*a semiconductor die*" and the ZnSe substrate 1 of Matsubara is  
15 considered "*a phosphor-containing medium*". However, as illustrated and described in Matsubara, the ZnSe substrate 1 and the epitaxial light emission structure 2 are parts of an LED 5, which is referred to as a "chip" (for example; see paragraphs [0040] and [0064]). Consequently, the epitaxial light emission structure 2 of Matsubara is not "*a semiconductor chip*" or "*a semiconductor die*,"  
20 as recited in the independent claims 1 and 8. Thus, the independent claims 1 and 8 are not anticipated by the cited reference of Matsubara.

As a fall back position, the Examiner asserts on page 8 of the Final Office Action that "[f]urther, 'semiconductor chip' or 'semiconductor die' and the  
25 associated language in the claims do not preclude the wavelength-shifting region being intregally [sic] part of the same chip or die." Applicants understand that claims must be given their broadest reasonable interpretation during patent examination. However, it is not reasonable to interpret the independent claims 1 and 8 such that the claimed "*wavelength-shifting region*" or "*phosphor-containing*  
30 *medium*" may be an integral part of the claimed "*semiconductor chip*" or "*semiconductor die*" when the claims recite "*a semiconductor chip*" or "*a semiconductor die*" AND "*a wavelength-shifting region*" or "*a phosphor-containing medium*" as separate elements. Furthermore, the independent claim 1

recites the “wavelength-shifting region” as “a wavelength-shifting region optically coupled to said semiconductor chip to receive said first light.” Such claim language does not make sense if the “wavelength-shifting region” is an integral part of the claimed “semiconductor chip.”

5

The independent claim 15 recites in part “generating first light of a first peak wavelength in a 481-520 nm range at a semiconductor die, including emitting said first light out of said semiconductor die” and “receiving said first light emitted out of said semiconductor die, including converting some of said first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material, said Group IIB element Selenide-based phosphor material including Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.” Since the ZnSe substrate 1 of Matsubara is part of a chip or die, Matsubara does not disclose “receiving said first light emitted out of said semiconductor die, including converting some of said first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material,” as recited in the independent claim 15. Thus, the independent claim 15 is also not anticipated by the cited reference of Matsubara.

#### B. Rejection of Claims 6 and 13 Under 35 U.S.C. §102(b)

The dependent claims 6 and 13 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by the cited references of Matsubara. In particular, the Examiner asserts that “the substrate 1 is coupled to the epitaxial structure 2 together forming a lamp.”

The dependent claim 6 recites “wherein said wavelength-shifting region is a part of a lamp coupled to said semiconductor chip.” Similarly, the dependent claim 13 recites “wherein said phosphor-containing medium is a part of a lamp coupled to said semiconductor die.” As explained above, the ZnSe substrate 1 and the epitaxial light emission structure 2 of Matsubara are parts of the

semiconductor chip 5. Thus, the epitaxial light emission structure 2 of Matsubara cannot be "*a part of a lamp coupled to said semiconductor*" chip or die, as recited in the dependent claims 6 and 13. Thus, the dependent claims 6 and 13 are not anticipated by the cited reference of Matsubara.

5

C. Rejection of Claims 7 and 14 Under 35 U.S.C. §102(b)

The dependent claims 7 and 14 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by the cited references of Matsubara. In particular, the Examiner asserts that "the entire device of figure 1 is considered a lamp as it  
10 outputs white light."

The dependent claim 7 recites "*wherein said wavelength-shifting region is a lamp coupled to said semiconductor chip.*" Similarly, the dependent claim 14  
15 recites "*wherein said phosphor-containing medium is a lamp coupled to said semiconductor die.*" Again, the ZnSe substrate 1 and the epitaxial light emission structure 2 of Matsubara are parts of the semiconductor chip 5. Thus, the epitaxial light emission structure 2 of Matsubara cannot be "*a lamp coupled to said semiconductor*" chip or die, as recited in the dependent claims 7 and 14. Thus,  
20 the dependent claims 7 and 14 are not anticipated by the cited reference of Matsubara.

SUMMARY

25 Contrary to the assertions made by the Examiner, the ZnSe substrate 1 and the epitaxial light emission structure 2 of Matsubara are parts of a single chip. Thus, the independent claims 1 and 8 are not anticipated by Matsubara because Matsubara does not disclose "*a semiconductor chip*" or "*a semiconductor die*" AND "*a wavelength-shifting region*" or "*a phosphor-containing medium*" that  
30 includes "*Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.*" Similarly, the independent claim 15 is not anticipated by Matsubara because Matsubara does not disclose "*receiving said first light emitted out of said*

*semiconductor die, including converting some of said first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material."* Furthermore, the dependent claims 6, 7, 13 and 14 are not anticipated by Matsubara because Matsubara does not disclose "a  
5 *wavelength-shifting region*" or "a phosphor-containing medium" that is a part of or is "a lamp coupled to said semiconductor" chip or die.

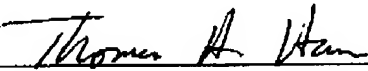
For all the foregoing reasons, it is earnestly and respectfully requested that  
10 the Board of Patent Appeals and Interferences reverse the rejections of the Examiner regarding claims 1-3, 5-10, 12-17, 19 and 20, so that this case may be allowed and pass to issue in a timely manner.

15

Respectfully submitted,  
Chua et al.

20

Date: October 20, 2005

By:   
Thomas H. Ham  
Registration No. 43,654  
Telephone: (925) 249-1300

**Appendix**

- 1     1.     A device for emitting output light, said device comprising:  
2             a semiconductor chip that emits first light of a first peak  
3     wavelength in a 481-520 nm range; and  
4             a wavelength-shifting region optically coupled to said  
5     semiconductor chip to receive said first light, said wavelength-shifting region  
6     including Group IIB element Selenide-based phosphor material having a property  
7     to convert some of said first light to second light of a second peak wavelength in a  
8     red wavelength range, said Group IIB element Selenide-based phosphor material  
9     including Group IIB element Selenide activated by at least one element selected  
10    from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver, said  
11    first light and said second light being components of said output light.
- 1     2.     The device of claim 1 wherein said Group IIB element Selenide-based  
2     phosphor material of said wavelength-shifting region includes Zinc Selenide.
- 1     3.     The device of claim 2 wherein said Group IIB element Selenide-based  
2     phosphor material of said wavelength-shifting region includes said Zinc Selenide  
3     activated by Copper.
- 1     4.     The device of claim 1 wherein said Group IIB element Selenide-based  
2     phosphor material of said wavelength-shifting region includes Cadmium Selenide.
- 1     5.     The device of claim 1 wherein said semiconductor chip is a light emitting  
2     diode die that can generate said first light of said first peak wavelength.
- 1     6.     The device of claim 1 wherein said wavelength-shifting region is a part of  
2     a lamp coupled to said semiconductor chip.
- 1     7.     The device of claim 1 wherein said wavelength-shifting region is a lamp  
2     coupled to said semiconductor chip.

1 8. A device for emitting output light, said device comprising:  
2 a semiconductor die that emits first light of a first peak wavelength  
3 in a 481-520 nm range; and  
4 a phosphor-containing medium positioned to receive said first  
5 light, said phosphor-containing medium including Group IIB element Selenide-  
6 based phosphor material having a property to convert some of said first light to  
7 second light of a second peak wavelength in a red wavelength range, said Group  
8 IIB element Selenide-based phosphor material including Group IIB element  
9 Selenide activated by at least one element selected from a group consisting of  
10 Copper, Chlorine, Fluorine, Bromine and Silver, said first light and said second  
11 light being components of said output light.

1 9. The device of claim 8 wherein said Group IIB element Selenide-based  
2 phosphor material of said phosphor-containing medium includes Zinc Selenide.

1 10. The device of claim 9 wherein said Group IIB element Selenide-based  
2 phosphor material of said phosphor-containing medium includes said Zinc  
3 Selenide activated by Copper.

1 11. The device of claim 8 wherein said Group IIB element Selenide-based  
2 phosphor material of said phosphor-containing medium includes Cadmium  
3 Selenide.

1 12. The device of claim 8 wherein said semiconductor die is a light emitting  
2 diode die.

1 13. The device of claim 8 wherein said phosphor-containing medium is a part  
2 of a lamp coupled to said semiconductor die.

1 14. The device of claim 8 wherein said phosphor-containing medium is a lamp  
2 coupled to said semiconductor die.

1 15. A method for emitting output light, said method comprising:  
2 generating first light of a first peak wavelength in a 481-520 nm  
3 range at a semiconductor die, including emitting said first light out of said  
4 semiconductor die;  
5 receiving said first light emitted out of said semiconductor die,  
6 including converting some of said first light to second light of a second peak  
7 wavelength in a red wavelength range using Group IIB element Selenide-based  
8 phosphor material, said Group IIB element Selenide-based phosphor material  
9 including Group IIB element Selenide activated by at least one element selected  
10 from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver; and  
11 emitting said first light and said second light as components of said  
12 output light.

1 16. (original) The method of claim 15 wherein said Group IIB element  
2 Selenide-based phosphor material includes Zinc Selenide.

1 17. The method of claim 16 wherein said Group IIB element Selenide-based  
2 phosphor material includes said Zinc Selenide activated by Copper.

1 18. The method of claim 15 wherein said Group IIB element Selenide-based  
2 phosphor material includes Cadmium Selenide.

1 19. The method of claim 15 wherein said generating includes generating said  
2 first light of said first peak wavelength at a light emitting diode die.

1 20. The method of claim 19 wherein said light emitting diode die is configured  
2 to generate said first light such that said first peak wavelength is within a blue-  
3 green region of the visible light spectrum.

Attorney Docket No. 70040065-1

PATENT APPLICATION

RECEIVED  
CENTRAL FAX CENTER

OCT 20 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Chua et al.

Group Art Unit: 2815

Serial No. 10/761,762

Confirmation No. 2866

Filed: January 21, 2004

Examiner: Richards, N. Drew

For: DEVICE AND METHOD FOR EMITTING OUTPUT LIGHT USING GROUP  
IIB ELEMENT SELENIDE-BASED PHOSPHOR MATERIALCommissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450BRIEF ON APPEAL

Sir/Madam:

This brief is in furtherance of Applicants' Notice of Appeal filed on August 26, 2005, appealing the decision of the Examiner dated June 29, 2005 finally rejecting claims 1-3, 5-10, 12-17, 19 and 20. A copy of the claims appears in the Appendix to this brief. This brief is transmitted in triplicate.

---

CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. 1.8

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being facsimile transmitted to the Patent and Trademark Office facsimile number (571) 273-8300 on October 20, 2005.

Number of Pages: 35 (including TRANSMITTAL LETTER)Signed: 

Typed Name: Thomas H. Ham



I. Real Party in Interest

The real party in interest in this appeal is Agilent Technologies, Inc., a Delaware Corporation, having a place of business at 3500 Deer Creek Road, Palo Alto, California 94304.

II. Related Appeals and Interferences

There are currently no related appeals or interference proceedings in progress that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the present Appeal.

III. Status of Claims

Claims 1-20 were originally filed with the application on January 21, 2004. In the Amendment and Response to Office Action filed on April 11, 2005, claims 1, 3, 5-8, 10, 13-15 and 17 were amended. No claims have been amended, canceled, or added for purposes of this Appeal.

Claims 1, 2, 5-9, 12-16, 19 and 20 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by U.S. Patent Application No. 2003/0008431 A1 (Matsubara et al., hereafter "Matsubara"). Furthermore, claims 3, 10 and 17 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Matsubara in view of U.S. Patent No. 6,509,651 B1 (Matsubara et al.). Claims 4, 11 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

This Appeal is made with regard to pending claims 1-20.

IV. Status of Amendments

No amendments were filed subsequent to final rejection.

V. Summary of the Invention

The claimed invention is a device and method for emitting output light using Group IIB element Selenide-based phosphor material to convert some of the original light emitted from a light source, e.g., a light emitting diode (LED) die, of the device to a longer wavelength light to change the optical spectrum of the output light (see Applicants' specification on page 2, lines 22-33). According to the invention, as recited in claims 1 and 8, a device for emitting output light comprises a semiconductor chip or die (102) that emits first light of a first peak wavelength in a 481-520 nm range, and a wavelength-shifting region or a phosphor-containing medium (116; 216B; 216C) optically coupled to the semiconductor chip or die to receive the first light. The wavelength-shifting region or the phosphor-containing medium includes Group IIB element Selenide-based phosphor material (118) having a property to convert some of the first light to second light of a second peak wavelength in a red wavelength range. The Group IIB element Selenide-based phosphor material includes Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver. The first light and the second light are components of the output light. According to the invention, as recited in claim 15, a method for emitting output light comprises generating (602) first light of a first peak wavelength in a 481-520 nm range at a semiconductor die, including emitting the first light out of the semiconductor die, receiving (604) the first light emitted out of the semiconductor die, including converting some of the first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material, and emitting (606) the first light and the second light as components of the output light. The Group IIB element Selenide-based phosphor material includes Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.

30

VI. Issues

Whether claims 1, 6-8 and 13-15 are anticipated under 35 U.S.C. 102(b) by Matsubara.

5

VII. Grouping of Claims for Each Contested Ground of Rejection

For purposes of this Appeal, claims 1, 8 and 15 stand or fall together, claims 6 and 13 stand or fall together, and claims 7 and 14 stand or fall together. The reason why the above-identified claims are grouped together is explained in the following Argument section.

10

VIII. Argument

15

A. Rejection of Claims 1, 8 and 15 Under 35 U.S.C. §102(b)

The independent claims 1, 8 and 15 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by the cited references of Matsubara (U.S. Patent Application No. 2003/0008431 A1). However, each recited element of the independent claims 1, 8 and 15 is not disclosed in the cited reference of Matsubara. Consequently, the independent claims 1, 8 and 15 are not anticipated by the cited reference of Matsubara.

20

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP §2131. The independent claim 1 recites in part “a semiconductor chip” and “a wavelength-shifting region” that includes “Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.” Similarly, the independent claim 8 recites in part “a semiconductor die” and “a phosphor-containing medium” that includes “Group IIB element Selenide activated by at

30

*least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.*" The cited reference of Matsubara does not disclose each of these recited elements of the independent claims 1 and 8.

5           The reference of Matsubara does not disclose "*a semiconductor chip*" or "*a semiconductor die*" AND "*a wavelength-shifting region*" or "*a phosphor-containing medium*" that includes "*Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver,*" as recited in the independent claims 1 and 8. With respect  
10 to claim 1, the Examiner asserts that the epitaxial light emission structure 2 of Matsubara is considered "*a semiconductor chip*" and the ZnSe substrate 1 of Matsubara is considered "*a wavelength-shifting region*". With respect to claim 8, the Examiner asserts that the epitaxial light emission structure 2 of Matsubara is considered "*a semiconductor die*" and the ZnSe substrate 1 of Matsubara is  
15 considered "*a phosphor-containing medium*". However, as illustrated and described in Matsubara, the ZnSe substrate 1 and the epitaxial light emission structure 2 are parts of an LED 5, which is referred to as a "chip" (for example, see paragraphs [0040] and [0064]). Consequently, the epitaxial light emission structure 2 of Matsubara is not "*a semiconductor chip*" or "*a semiconductor die*,"  
20 as recited in the independent claims 1 and 8. Thus, the independent claims 1 and 8 are not anticipated by the cited reference of Matsubara.

As a fall back position, the Examiner asserts on page 8 of the Final Office Action that "[f]urther, 'semiconductor chip' or 'semiconductor die' and the  
25 associated language in the claims do not preclude the wavelength-shifting region being intregally [sic] part of the same chip or die." Applicants understand that claims must be given their broadest reasonable interpretation during patent examination. However, it is not reasonable to interpret the independent claims 1 and 8 such that the claimed "*wavelength-shifting region*" or "*phosphor-containing*  
30 *medium*" may be an integral part of the claimed "*semiconductor chip*" or "*semiconductor die*" when the claims recite "*a semiconductor chip*" or "*a semiconductor die*" AND "*a wavelength-shifting region*" or "*a phosphor-containing medium*" as separate elements. Furthermore, the independent claim 1

recites the “wavelength-shifting region” as “a wavelength-shifting region optically coupled to said semiconductor chip to receive said first light.” Such claim language does not make sense if the “wavelength-shifting region” is an integral part of the claimed “semiconductor chip.”

5

The independent claim 15 recites in part “generating first light of a first peak wavelength in a 481-520 nm range at a semiconductor die, including emitting said first light out of said semiconductor die” and “receiving said first light emitted out of said semiconductor die, including converting some of said first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material, said Group IIB element Selenide-based phosphor material including Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver.” Since the ZnSe substrate 1 of Matsubara is part of a chip or die, Matsubara does not disclose “receiving said first light emitted out of said semiconductor die, including converting some of said first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material,” as recited in the independent claim 15. Thus, the independent claim 15 is also not anticipated by the cited reference of Matsubara.

#### B. Rejection of Claims 6 and 13 Under 35 U.S.C. §102(b)

The dependent claims 6 and 13 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by the cited references of Matsubara. In particular, the Examiner asserts that “the substrate 1 is coupled to the epitaxial structure 2 together forming a lamp.”

The dependent claim 6 recites “wherein said wavelength-shifting region is a part of a lamp coupled to said semiconductor chip.” Similarly, the dependent claim 13 recites “wherein said phosphor-containing medium is a part of a lamp coupled to said semiconductor die.” As explained above, the ZnSe substrate 1 and the epitaxial light emission structure 2 of Matsubara are parts of the

semiconductor chip 5. Thus, the epitaxial light emission structure 2 of Matsubara cannot be *"a part of a lamp coupled to said semiconductor"* chip or die, as recited in the dependent claims 6 and 13. Thus, the dependent claims 6 and 13 are not anticipated by the cited reference of Matsubara.

5

C. Rejection of Claims 7 and 14 Under 35 U.S.C. §102(b)

The dependent claims 7 and 14 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by the cited references of Matsubara. In particular, the  
10 Examiner asserts that "the entire device of figure 1 is considered a lamp as it outputs white light."

The dependent claim 7 recites *"wherein said wavelength-shifting region is a lamp coupled to said semiconductor chip."* Similarly, the dependent claim 14  
15 recites *"wherein said phosphor-containing medium is a lamp coupled to said semiconductor die."* Again, the ZnSe substrate 1 and the epitaxial light emission structure 2 of Matsubara are parts of the semiconductor chip 5. Thus, the epitaxial light emission structure 2 of Matsubara cannot be *"a lamp coupled to said semiconductor"* chip or die, as recited in the dependent claims 7 and 14. Thus,  
20 the dependent claims 7 and 14 are not anticipated by the cited reference of Matsubara.

SUMMARY

25 Contrary to the assertions made by the Examiner, the ZnSe substrate 1 and the epitaxial light emission structure 2 of Matsubara are parts of a single chip. Thus, the independent claims 1 and 8 are not anticipated by Matsubara because Matsubara does not disclose *"a semiconductor chip"* or *"a semiconductor die"* AND *"a wavelength-shifting region"* or *"a phosphor-containing medium"* that  
30 includes *"Group IIB element Selenide activated by at least one element selected from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver."* Similarly, the independent claim 15 is not anticipated by Matsubara because Matsubara does not disclose *"receiving said first light emitted out of said*

semiconductor die, including converting some of said first light to second light of a second peak wavelength in a red wavelength range using Group IIB element Selenide-based phosphor material." Furthermore, the dependent claims 6, 7, 13 and 14 are not anticipated by Matsubara because Matsubara does not disclose "a wavelength-shifting region" or "a phosphor-containing medium" that is a part of or is "a lamp coupled to said semiconductor" chip or die.

For all the foregoing reasons, it is earnestly and respectfully requested that the Board of Patent Appeals and Interferences reverse the rejections of the Examiner regarding claims 1-3, 5-10, 12-17, 19 and 20, so that this case may be allowed and pass to issue in a timely manner.

Respectfully submitted,

Chua et al.

Date: October 20, 2005

By: Thomas H. Ham  
Thomas H. Ham  
Registration No. 43,654  
Telephone: (925) 249-1300

**Appendix**

- 1     1.     A device for emitting output light, said device comprising:  
2                 a semiconductor chip that emits first light of a first peak  
3     wavelength in a 481-520 nm range; and  
4                 a wavelength-shifting region optically coupled to said  
5     semiconductor chip to receive said first light, said wavelength-shifting region  
6     including Group IIB element Selenide-based phosphor material having a property  
7     to convert some of said first light to second light of a second peak wavelength in a  
8     red wavelength range, said Group IIB element Selenide-based phosphor material  
9     including Group IIB element Selenide activated by at least one element selected  
10    from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver, said  
11    first light and said second light being components of said output light.
  
- 1     2.     The device of claim 1 wherein said Group IIB element Selenide-based  
2     phosphor material of said wavelength-shifting region includes Zinc Selenide.
  
- 1     3.     The device of claim 2 wherein said Group IIB element Selenide-based  
2     phosphor material of said wavelength-shifting region includes said Zinc Selenide  
3     activated by Copper.
  
- 1     4.     The device of claim 1 wherein said Group IIB element Selenide-based  
2     phosphor material of said wavelength-shifting region includes Cadmium Selenide.
  
- 1     5.     The device of claim 1 wherein said semiconductor chip is a light emitting  
2     diode die that can generate said first light of said first peak wavelength.
  
- 1     6.     The device of claim 1 wherein said wavelength-shifting region is a part of  
2     a lamp coupled to said semiconductor chip.
  
- 1     7.     The device of claim 1 wherein said wavelength-shifting region is a lamp  
2     coupled to said semiconductor chip.



- 1 8. A device for emitting output light, said device comprising:  
2 a semiconductor die that emits first light of a first peak wavelength  
3 in a 481-520 nm range; and  
4 a phosphor-containing medium positioned to receive said first  
5 light, said phosphor-containing medium including Group IIB element Selenide-  
6 based phosphor material having a property to convert some of said first light to  
7 second light of a second peak wavelength in a red wavelength range, said Group  
8 IIB element Selenide-based phosphor material including Group IIB element  
9 Selenide activated by at least one element selected from a group consisting of  
10 Copper, Chlorine, Fluorine, Bromine and Silver, said first light and said second  
11 light being components of said output light.
- 1 9. The device of claim 8 wherein said Group IIB element Selenide-based  
2 phosphor material of said phosphor-containing medium includes Zinc Selenide.
- 1 10. The device of claim 9 wherein said Group IIB element Selenide-based  
2 phosphor material of said phosphor-containing medium includes said Zinc  
3 Selenide activated by Copper.
- 1 11. The device of claim 8 wherein said Group IIB element Selenide-based  
2 phosphor material of said phosphor-containing medium includes Cadmium  
3 Selenide.
- 1 12. The device of claim 8 wherein said semiconductor die is a light emitting  
2 diode die.
- 1 13. The device of claim 8 wherein said phosphor-containing medium is a part  
2 of a lamp coupled to said semiconductor die.
- 1 14. The device of claim 8 wherein said phosphor-containing medium is a lamp  
2 coupled to said semiconductor die.

1 15. A method for emitting output light, said method comprising:  
2 generating first light of a first peak wavelength in a 481-520 nm  
3 range at a semiconductor die, including emitting said first light out of said  
4 semiconductor die;  
5 receiving said first light emitted out of said semiconductor die,  
6 including converting some of said first light to second light of a second peak  
7 wavelength in a red wavelength range using Group IIB element Selenide-based  
8 phosphor material, said Group IIB element Selenide-based phosphor material  
9 including Group IIB element Selenide activated by at least one element selected  
10 from a group consisting of Copper, Chlorine, Fluorine, Bromine and Silver; and  
11 emitting said first light and said second light as components of said  
12 output light.

1 16. (original) The method of claim 15 wherein said Group IIB element  
2 Selenide-based phosphor material includes Zinc Selenide.

1 17. The method of claim 16 wherein said Group IIB element Selenide-based  
2 phosphor material includes said Zinc Selenide activated by Copper.

1 18. The method of claim 15 wherein said Group IIB element Selenide-based  
2 phosphor material includes Cadmium Selenide.

1 19. The method of claim 15 wherein said generating includes generating said  
2 first light of said first peak wavelength at a light emitting diode die.

1 20. The method of claim 19 wherein said light emitting diode die is configured  
2 to generate said first light such that said first peak wavelength is within a blue-  
3 green region of the visible light spectrum.